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Every article we ship is sent out absolutely on 30 days' free trial—unless it satisfies you there is no sale.

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222 N. Wabash Avenue Chicago

QUEER FACTS CONCERNING LIGHT

Meteors and Light

HOW many know that the earth is getting larger each year from the fall of meteoric matter on its surface, and that such matter is of no small weight? One hundred tons a day is the estimate made by Young. This, he says, would make a layer one inch thick over the entire earth in one thousand million years, if we assume this meteoric matter to be three times as heavy as water. But another effect has to take place at the same time: as the earth is getting larger the force of gravity gets larger, and we are being attracted with more force toward the sun; but the centrifugal force keeping us away from the sun gets much greater too, and in fact more so than the sun's gravity, the result being that we are gradually increasing our distance from the glowing orb.

Starlight has been measured in comparison with the sunlight, and the following results been announced: The light received from a star of the first magnitude like Vega is about one forty-thousandth-millionth of the sun's. Young places the total starlight received by the earth at the value of three thousand first-magnitude stars, thus making the whole starlight to be one-sixtieth that of the full moon.

Light has an actual mechanical pressure and can be measured in the laboratory. It has been found that the sun's light in itself presses against the earth with a force something like seventy thousand tons. As the surface of a sphere varies as the square of the radius, and as the volume or mass varies as the cube of the radius, and as the mechanical pressure of light on the whole surface varies as that surface, and as the force of gravity varies as the mass,—if a sphere was made smaller and smaller it is easily seen that the pressure of light does not decrease so fast as the force of gravity; so bodies beyond a certain minuteness could not reach the sun, but would be repelled by the mechanical force of its light.

A Big Marine Light

AN example of the immense increase in the power of modern marine lights is furnished by the equipment of the St. Catharines Lighthouse on the south coast of the Isle of Wight. It has a power of fifteen million candles, as against the three million candlepower of the light it replaced. The later lens throws three distinct beams of light, which follow one another across the water. The apparatus revolves in a trough of mercury, on which it is floated, instead of being carried by rollers as hitherto. Over eight hundred pounds of mercury is required to fill the trough.

The Searchlight's Beam

NEARLY everybody is familiar with the beam of a searchlight, and knows why the beam is visible, while light itself cannot be seen unless it strikes the eye, its visibility being due to particles in the air which really reflect the light to the eye. On a foggy night, if one will notice, the beam seems to come abruptly to an end if the light is pointed upward. It does this instead of gradually fading away into nothing, as it does pointed horizontally on a uniformly foggy night.

The thing is rather puzzling to one first seeing it; but the reason is not far to seek. Where the end of the beam seems to be there is the place the fog ends; for the beam cannot be visible to us unless there are small particles in its path. This is of great help to sailors in judging of the state of the weather; for they can tell exactly how thick the fog is, or rather how deep it is. They can also tell by throwing the light horizontally whether the fog is universal or occurring only in patches; for, if extending to a great distance, the beam gradually gets dimmer and dimmer, but if in patches the beam is lighter in patches, and if it goes through a place with no fog at all that part of the beam is black or invisible.

Why the Tallow Dip

WHY is it that the more electric lights there are, and the more kerosene burned, the greater is the demand for old fashioned wax and tallow candles? So popular, indeed, is the "tallow dip," that the factories of this country annually consume some one hundred and thirty million pounds of material in turning out the tapers. In London there is a candle factory that extends over fifteen acres, while some idea of the prosperity of the industry as carried on in the United States may be gathered from the fact that fifteen factories have a very high and dignified rating with commercial agencies.

The paradox becomes still more curious when it is learned that it is generally those

communities which burn the most of gas or oil or electricity that also seem addicted to the use of the oldtime illuminant. Take mines, for example. Where electricity is to be found as a lighting as well as an operating power, the tallow candle seems to be burned with almost lavish prodigality.

The complaints will be remembered that have been handed down verbally and in print, that the introduction of machinery would deprive no end of men of jobs. Printers can remember when the introduction of typesetting machines seemed to threaten their very existence. Time has shown these fears to be futile. The demand for the services of such men ever increases. Men are needed to run the machinery. Facility of production seems only to increase the needs for commodities.

But how does this explain the use of the tallow dip alongside the most modern of illuminants? In few places is found the horse car, for instance, in competition with the electric car. The answer is simple enough. The better system of lighting to which we are now accustomed has rendered us impatient of gloom. Where we cannot take our incandescent bulb or gasjet, there we insist upon having some illuminant, and the ever-handy tallow candle answers the purpose. Gas or the electric lamp does not quite dispel the shadow in that particular corner of the hall; hence the tallow dip.

Light and Energy

STATISTICS showing the enormous waste of energy involved in the production of artificial light are always interesting, if for no other reason than that they must continually stimulate inventors in the search for better methods.

Sir James Dewar presented these figures before the Royal Institution of Great Britain: In an ordinary candle the total quantity of energy transformed into light is only two per cent. Oil and gas lamps are not more economical. The incandescent electric lamp utilizes three per cent. of the energy expended, the arc light ten per cent., and the magnesium light fifteen per cent. Then comes the glow worm and mocks us with its ninety per cent. of expended energy turned into light.

Light from Sugar

THIS phenomenon, the cause of which has not yet been satisfactorily explained, may be observed when disks of loaf sugar are mounted on a lathe and rapidly rotated while a hammer plays lightly against them. An almost continuous radiation of light may be thus produced from the sugar. It has been shown that the light does not arise from heating of the sugar, and it is believed to be caused by some change taking place in the sugar crystals. The act of crystallization is known to be sometimes accompanied by flashes of light. The practical bearing of these experiments is on the question of the possibility of obtaining artificial light by methods as yet untried.

Automatic Lamp Lighting

THE property of selenium to vary its electric resistance in accordance with the intensity of the light falling on it has led to the invention of an apparatus for the automatic lighting and extinguishing of lamps.

A selenium cell is so arranged in a circuit that it activates a switch in one direction when daylight falls on it and in the opposite direction when darkness ensues. Thus an electric lamp, or a gaslamp provided with a small igniting flame, may be caused to light itself on the approach of night and to turn itself out at daybreak. A similar arrangement may be used for automatically turning off the stopcock when a gaslight is accidentally extinguished.

Light and Perfumes

A GARDEN full of flowers is more fragrant when shadowed by a cloud than when bathed in sunshine; at least that is the conclusion to which recent experiments of a French scientist lead. He asserts that it is light, and not, as commonly believed, oxygen, that exerts the greatest influence in destroying odors.

According to the same authority, the intensity of the perfume given off by a flower depends upon the relation between the pressure of water in the cells of the plant, which tends to drive out the essential oils that cause the odor, and the action of the sunlight, which tends to diminish water pressure in the cells. Sprinkling the plant increases the turgescence, and as a consequence a more copious production of perfume. At night the air round a flower bed is heavy with odors, because then their emanation is not opposed by the sunlight.

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